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Creating a new environment, tools and calibration of tools using UCCserver V4.5

UCC
by RENISHAW.

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MODUS

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Creating a new environment, tools and calibration of tools using UCCserver V4.5

Care of equipment

Renishaw probes and associated systems are precision tools used for obtaining precise measurements and must therefore be treated with care.

Changes to Renishaw products

Renishaw reserves the right to improve, change or modify its hardware or software without incurring any obligations to make changes to Renishaw equipment previously sold.

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Prior consent must be obtained from Renishaw if non-Renishaw equipment (e.g. interfaces and/or cabling) is to be used or substituted. Failure to comply with this will invalidate the Renishaw warranty.

Claims under warranty must be made from authorised service centres only, which may be advised by the supplier or distributor.

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All trademarks and tradenames are acknowledged.

Contents

1   Creating a new environment, tools and calibration of tools

1.1   Tutorial pre-requisites

• None

1.2   Tutorial objectives

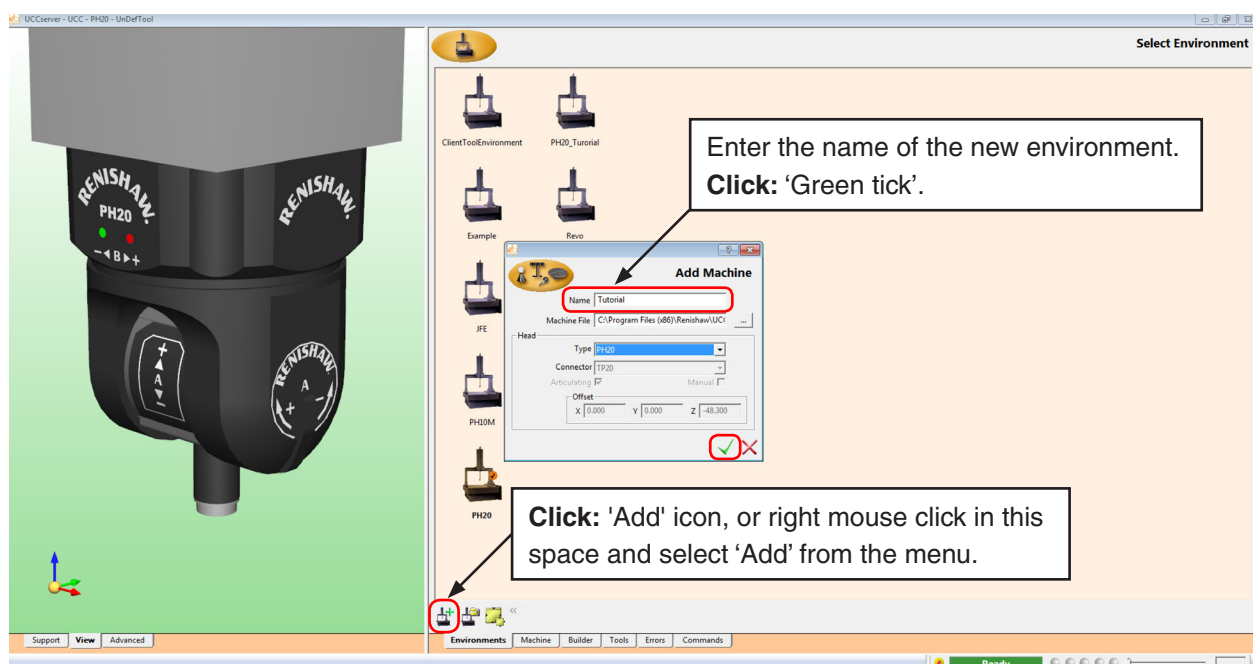• Appreciation of Renishaw specific hardware and software interaction

• Understanding of tool calibration, artefact and ancillary equipment definition and utilisation

2   Introduction

This tutorial will introduce the student to the Renishaw specific methods of system setup. These methods comply with the I++ standard of CMM interface. UCCserver and this tutorial is for use with any Renishaw or OEM client software.

3   Creating a new environment

Start UCCserver by double-clicking on the UCCserver icon:

Select: View.

Enter the name of the new environment.
Click: 'Green tick'.

Add Machine

Name   Tutorial

Machine File   C:\Program Files (x86)\Renishaw\UCC

Head

Type   PH20

Connector   TP20

Articulating ☑   Manual ☐

Offset

X 0.000   Y 0.000   Z -48.300

Click: 'Add' icon, or right mouse click in this space and select 'Add' from the menu.
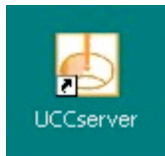
Enter the name of the machine configuration file (.ini)
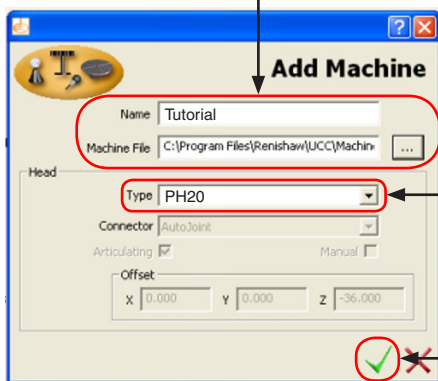
(This is usually located in the following directory -

C:\Program Files (x86)\Renishaw\UCC\Machine\'Your machine directory'*******.ini)

and the probe type fitted to the machine.

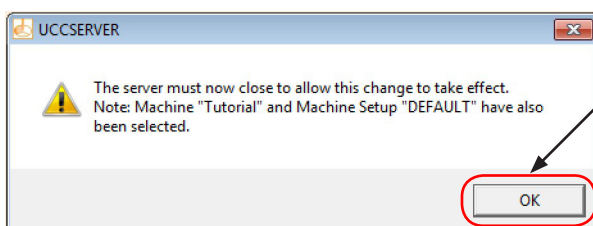
Check the correct probe type is shown here, if not select the correct type.

Click: 'Green tick' when all information has been added.

Current active environment.
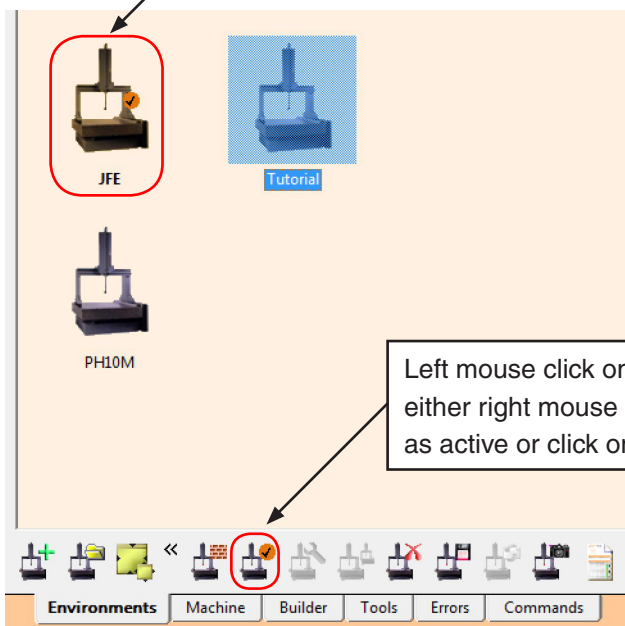
Left mouse click on the new environment and either right mouse click on and use the menu to set as active or click on the 'Set as active' icon.
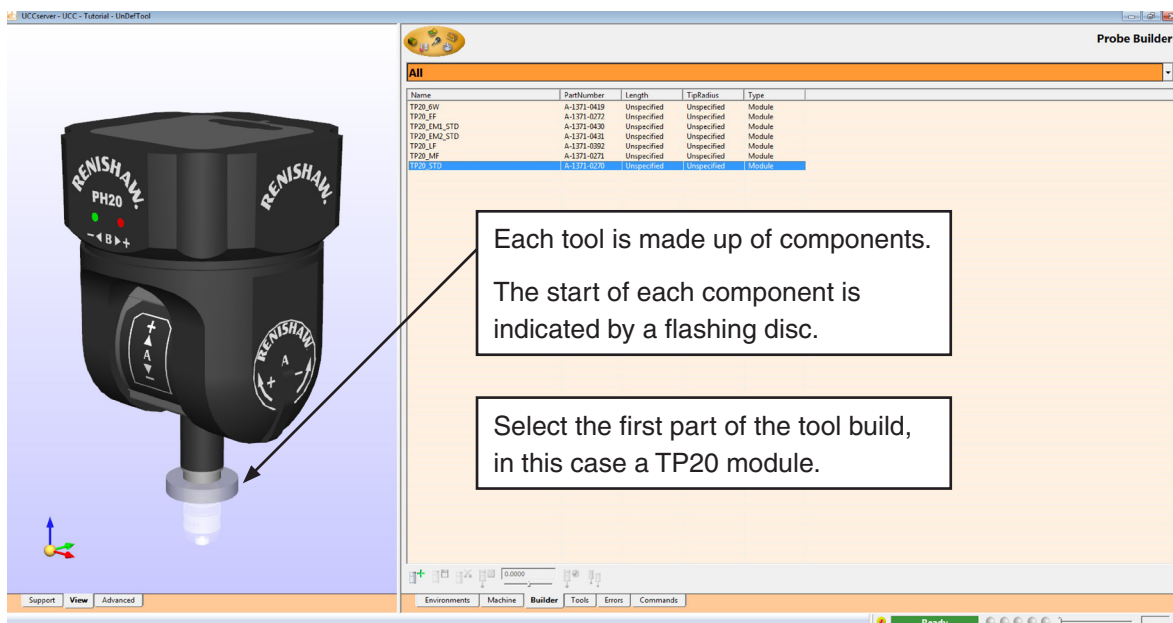

Click: 'OK'.

Restart UCCserver which will make the new environment active.

4   Building new tools

Following creation of the environment, the tools required for measurement must be created. This next part of the tutorial shows how to achieve this. Although this tutorial pictorially shows a PH20 probe head in the example screen shots, the methods described are applicable to all probe installations.

Click: 'Builder' tab.

Each tool is made up of components.

The start of each component is indicated by a flashing disc.

Select the first part of the tool build, in this case a TP20 module.
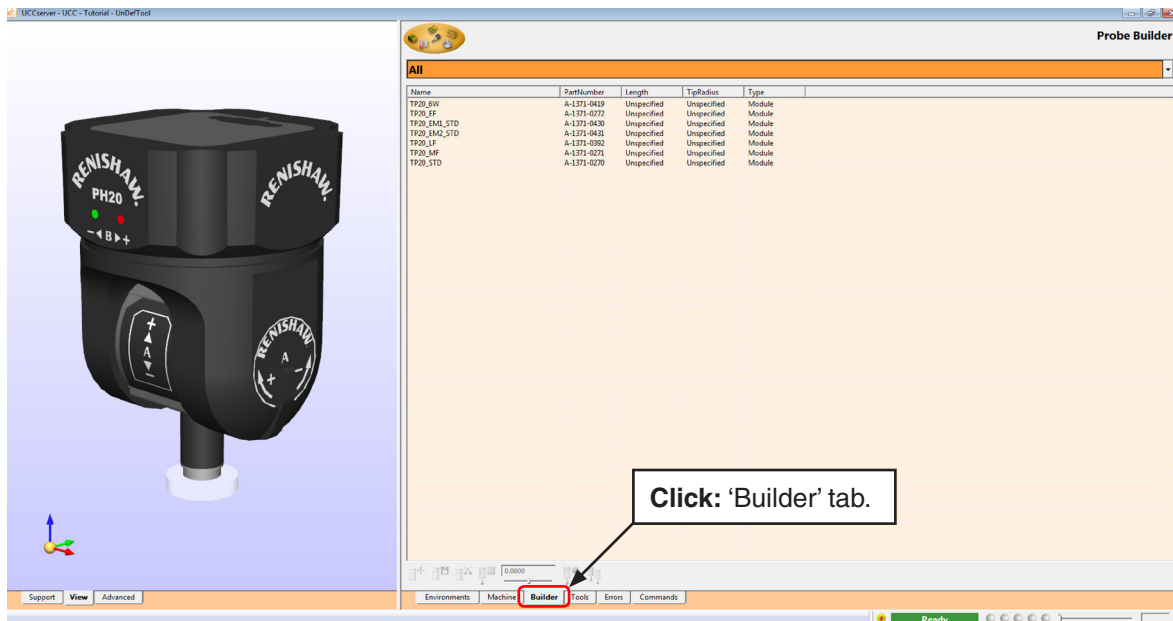
The selection and use of tool components is very important, especially when using tool change racks, and will be covered in greater depth in a separate tutorial.

To add this component to the tool build either double left click on the part or left click on the 'Add' button as shown to the left of this box:
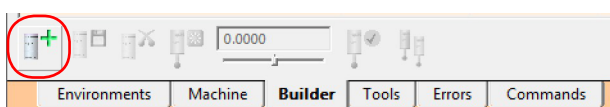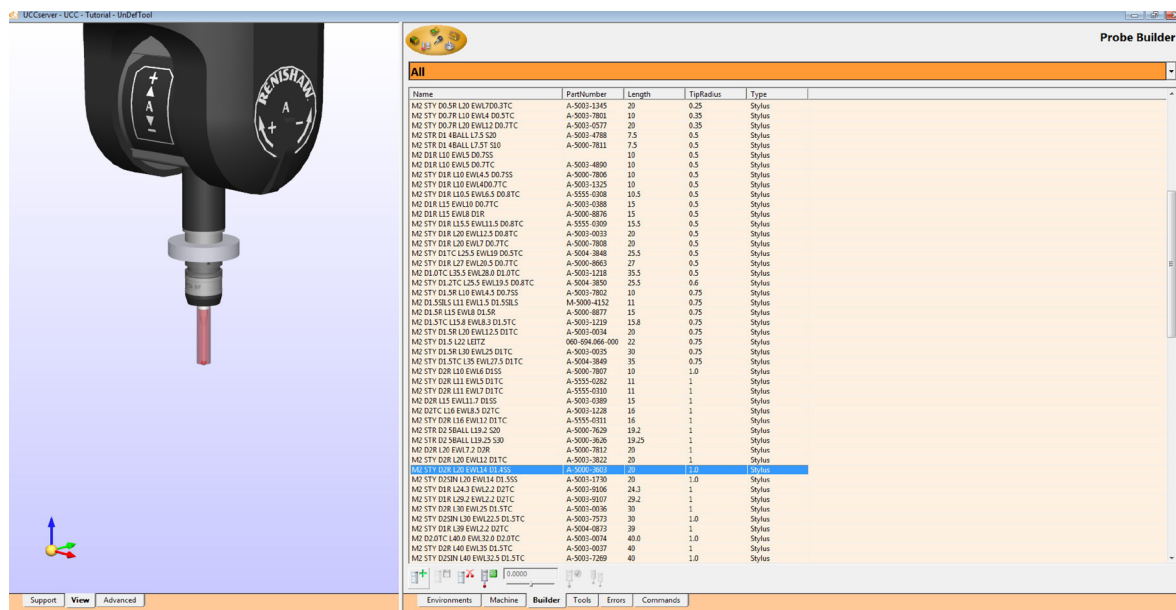
Again to add this component to the tool build either double left click on the part or left click on the 'Add' button as shown to the left of this box:
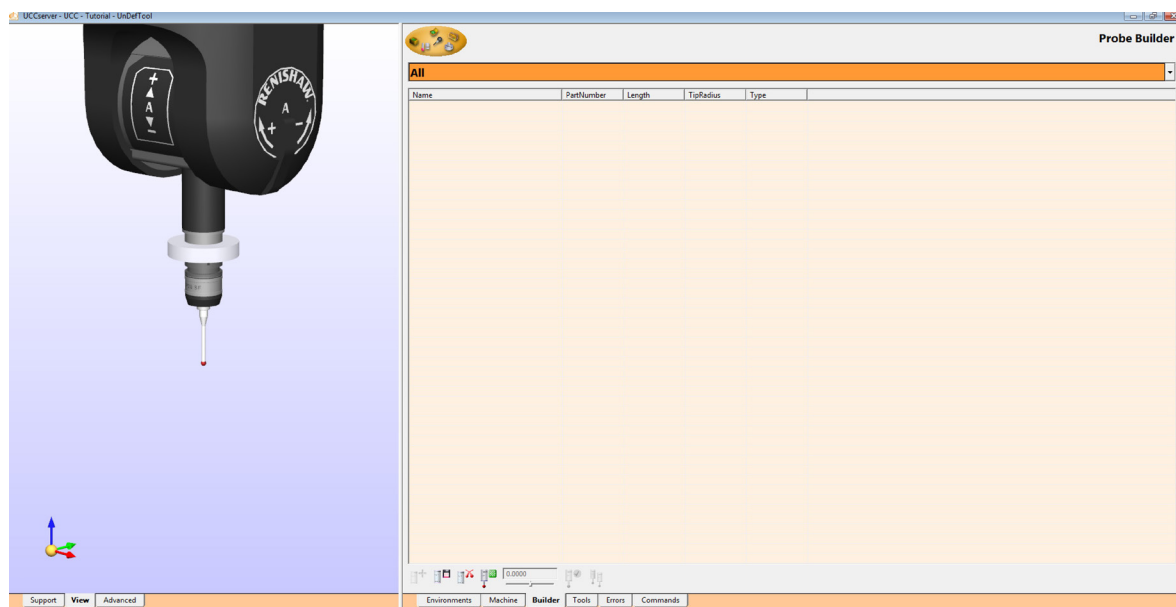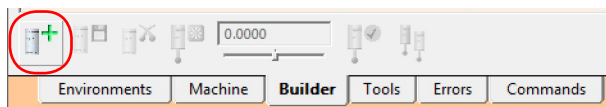
Click: 'Save' button to save the component assembly.

Name the component in the 'Save Component' box.
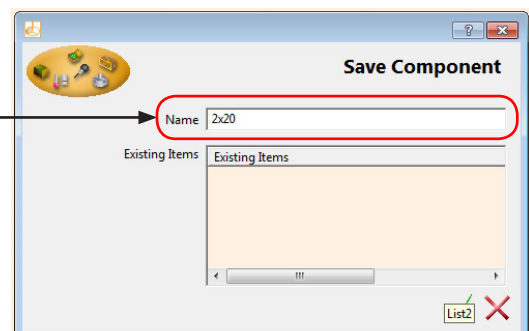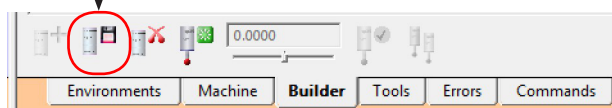
In this example the completed component can now be saved as a tool.

Click: 'Save tool' button.
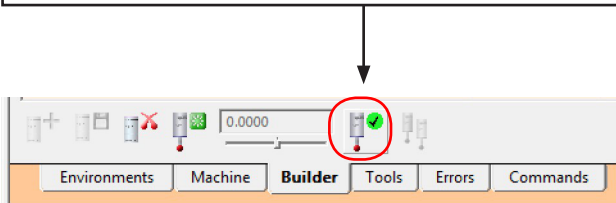
As this is the first tool to be saved the button will state 'Create as RefTool'. When the button is pressed the box below will appear.

At this point in training RefTool should be regarded as a system tool only and it is recommended that it is not used for general measurement functions.

UCCSERVER

RefTool must be defined before other tools. Copy assembly to RefTool?

OK   Cancel
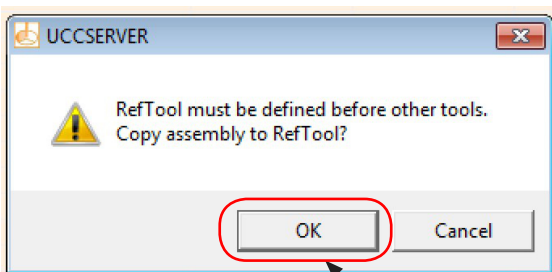
Click: 'OK'.

Press the 'Save tool' button again to add the same component assembly as a measurement tool.

This new measurement Tool is an exact copy of RefTool but can be used for measurement functions.
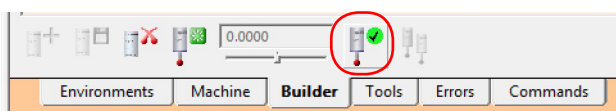
Give the new tool a name.

Click: 'Green tick'.

Add Tool

Name   TP20_2x20

Existing Items   Existing Items
BaseTool
NoTool
RefTool
UnDefTool
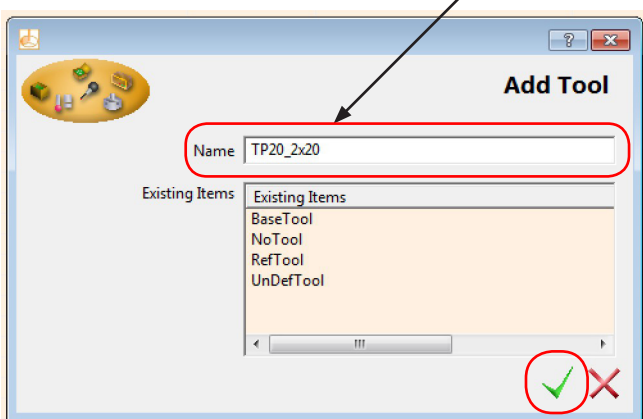
Left click on the 'Machine' tab to see the two tools that have been created.
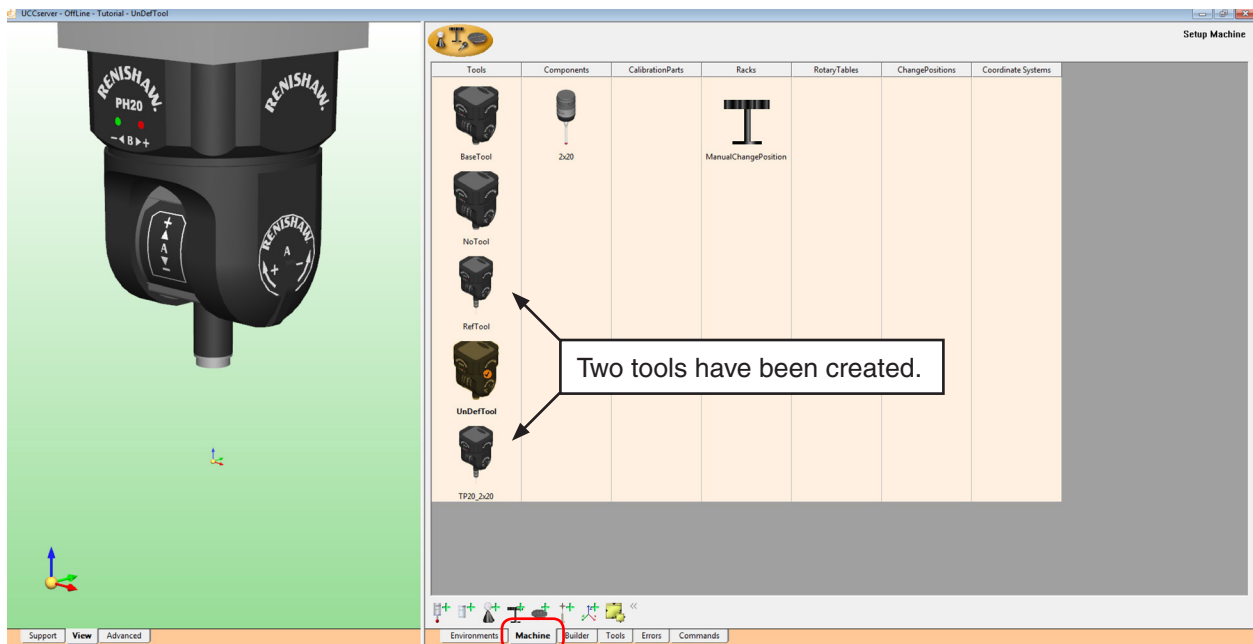
An explanation of the other tool icons shown i.e BaseTool, NoTool and UnDefTool is given later in this tutorial.

The next function to carry out is to add a calibration sphere to the system.

5   Adding a calibration sphere

Right mouse click on this part of the screen then left mouse click on 'Add calibration part'.

Alternatively, click on the 'Add sphere' icon arrowed.
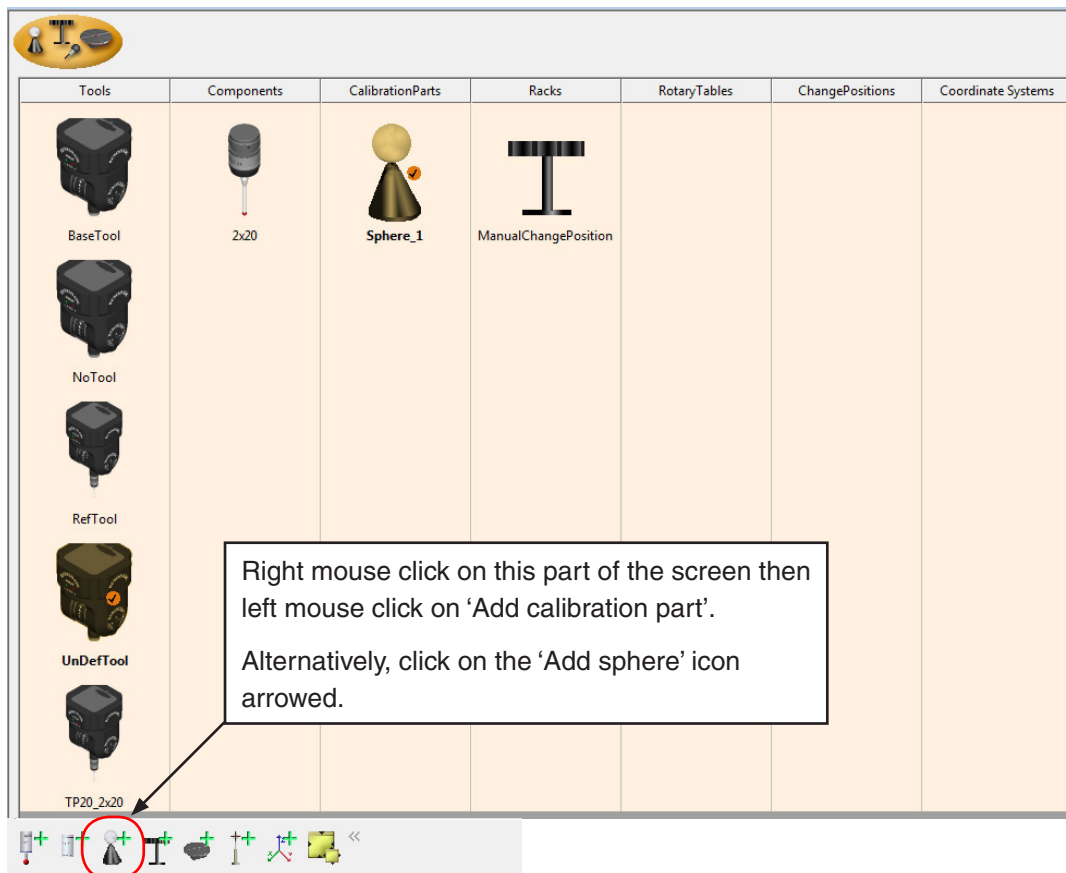
Enter the 'Sphere Diameter' and click the relevant 'Safe Direction to Use' box. For further information on these and other sphere parameters refer to the UCCserver help files by pressing F1.
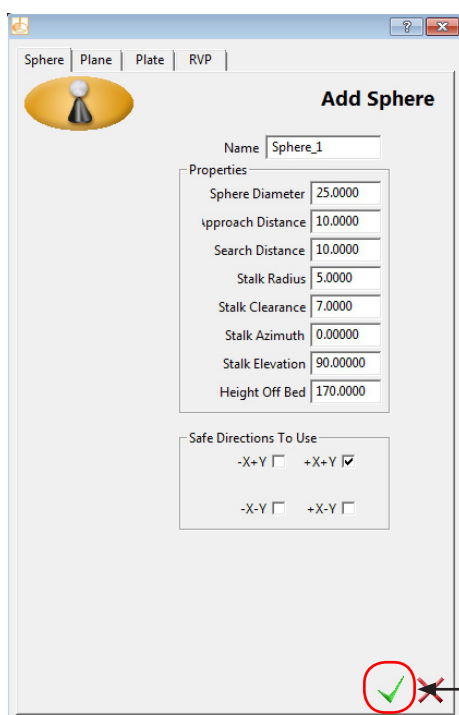
If specific help is required, as an alternative to pressing F1, left mouse click on the ? icon and then click on the specific item help is required for. The help information relative to that item will appear. In this example - Stalk Elevation:
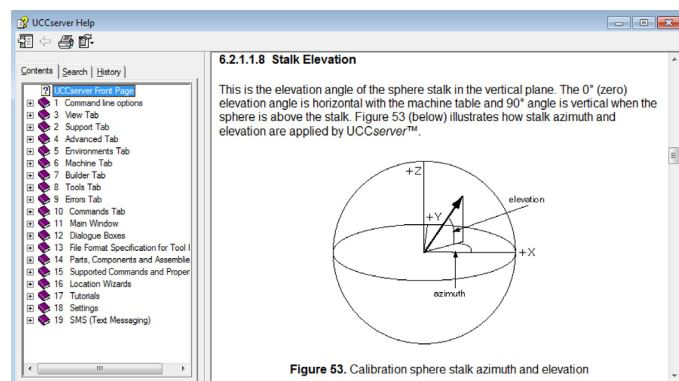
Click: 'Green tick' to continue.

New sphere added.
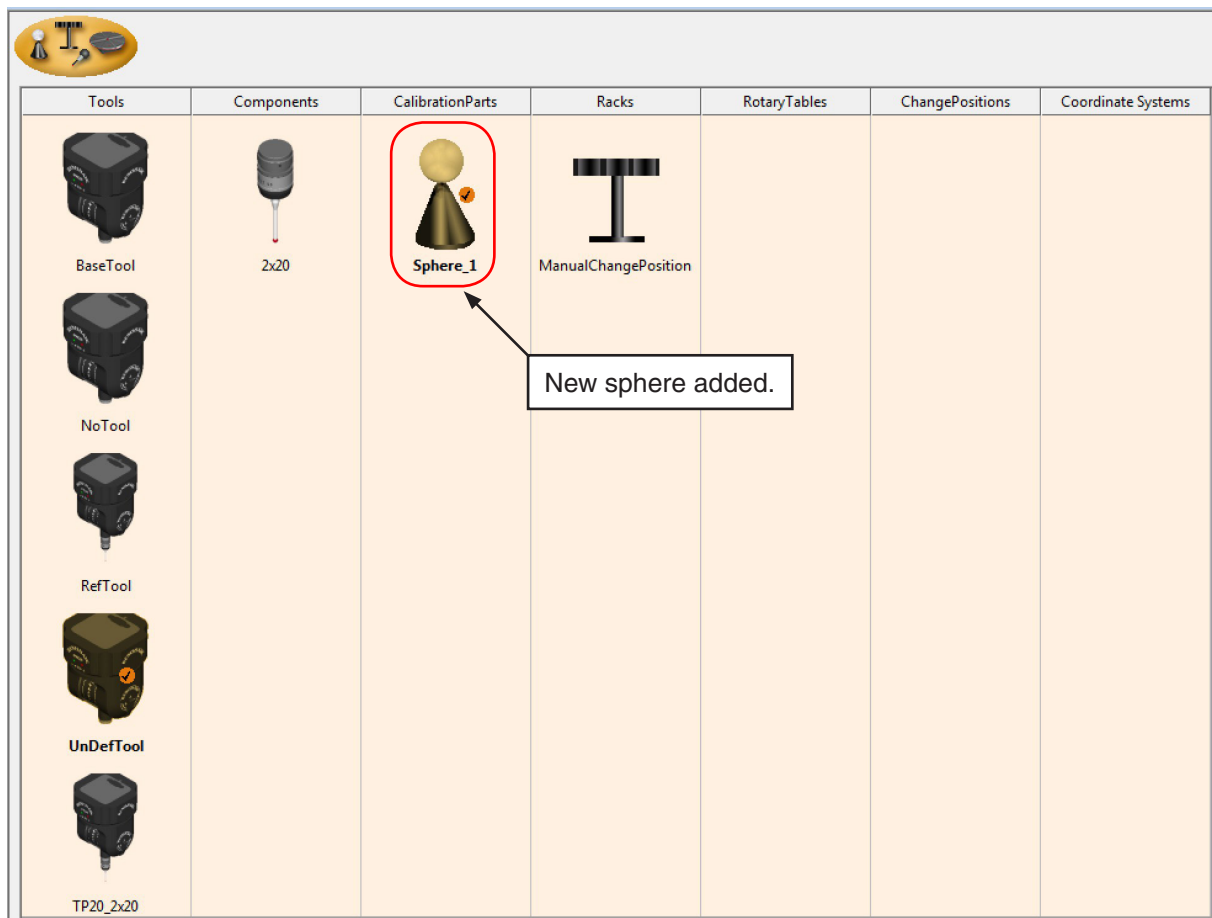
RefTool will now have to be calibrated before calibration of other tools.

6   Calibration of tools

Tool Properties

UnDefTool
BaseTool
NoTool
RefTool
TP20_2x20.1.20.2.A0.0-B0.0
UnDefTool

Click on the 'TOOLS' tab then from the drop-down menu select RefTool.

Click: 'Set tool' icon.

'Set Tool' icon.

Environments | Machine | Builder | **Tools** | Errors | Commands
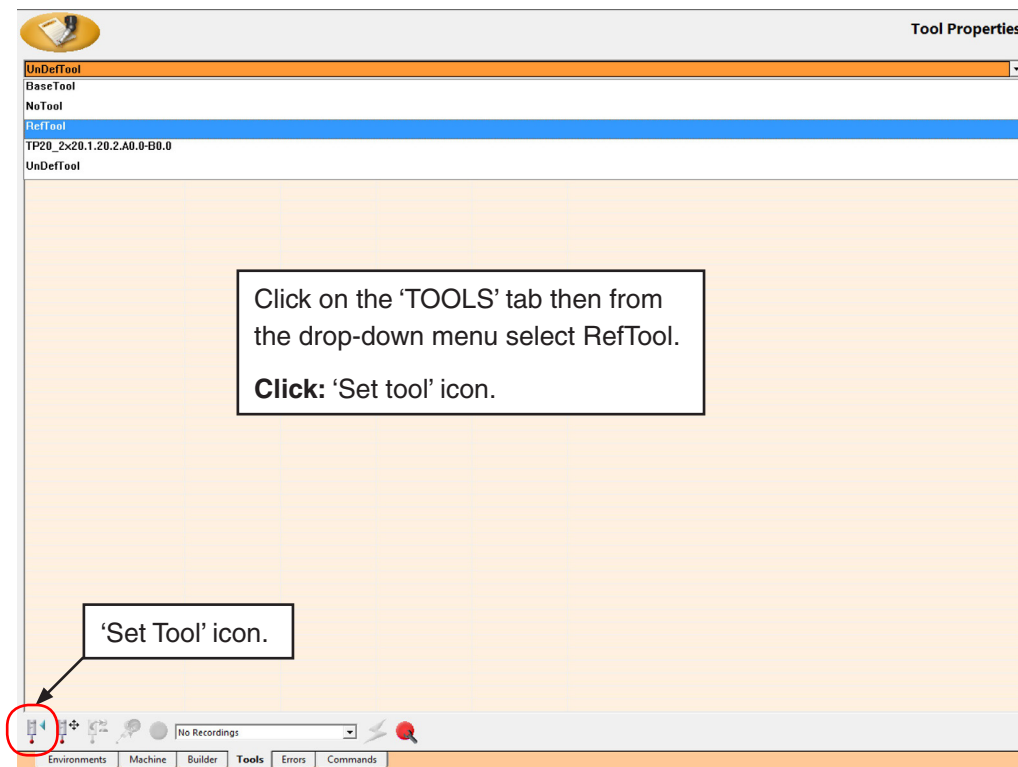
NOTE: *Set* - informs the system of what tool is fitted to the probe.

If the controller has been switched off then the system will warn that it will go to the home position.

UCCSERVER

The machine is going to move to its home position. Is it safe to continue?

Yes   No
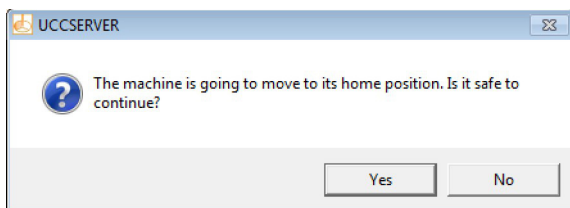
If the E-STOP has been activated, and / or if the machine has not been used for any length of time, the head must be engaged for a minimum of 45 minutes to ensure that it reaches optimum metrology temperature. This ensures that accurate metrology results are obtained.

When the CMM has completed the home move click on the 'Requalify' icon to start the tool calibration routine.

Requalify

Environments | Machine | Builder | **Tools** | Errors | Commands
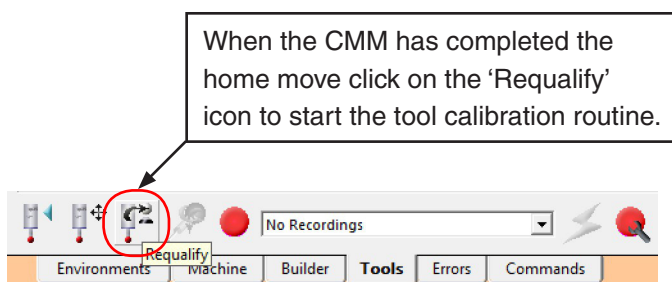
For ease of use, and within this tutorial, the terms 'Calibrate' and 'Requalify' should be regarded as the same thing. Both routines calibrate the tool involved

Tool Properties

RefTool

Property	Actual	Minimum	Maximum	Default
GoToPar.Speed	100.00000000	2.00000000	692.82032300	100.00000000
GoToPar.Accel	300.00000000	2.00000000	400.00000000	300.00000000
GoToPar.RSpeed	15.00000000	0.01000000	30.00000000	15.00000000
GoToPar.BlendDistance	4.00000000	0.00000000	100.00000000	4.00000000
PtMeasPar.Speed	10.00000000	1.00000000	15.00000000	10.00000000
PtMeasPar.Approach	5.00000000	0.00000000	100.00000000	5.00000000
PtMeasPar.Search	8.00000000	0.00000000	100.00000000	8.00000000
PtMeasPar.Retract	5.00000000	-1.00000000	100.00000000	5.00000000
PtMeasPar.HeadSpeed	15.00000000	10.00000000	50.00000000	15.00000000
PtMeasPar.HeadTouch	0	0	3	0
TipCorrectPar.NPoints	4	1	10	4
TipCorrectPar.Enabled	true	false	false	true
RMSError	0.00000000	0.00000000	1.00000000	0.00000000
MinError	0.00000000	-1.00000000	1.00000000	0.00000000
MaxError	0.00000000	-1.00000000	1.00000000	0.00000000
Form	0.00000000	0.00000000	1.00000000	0.00000000
ED	2.00000000	1.50000000	2.50000000	2.00000000

UCCSERVER

Position tool so that stylus points directly at Sphere Sphere_1

[OK]   [Cancel]

No Recordings

Environments | Machine | Builder | **Tools** | Errors | Commands

It is important to ensure that the MCU 'Speed override' is set to maximum prior to carry out the following calibration procedures.

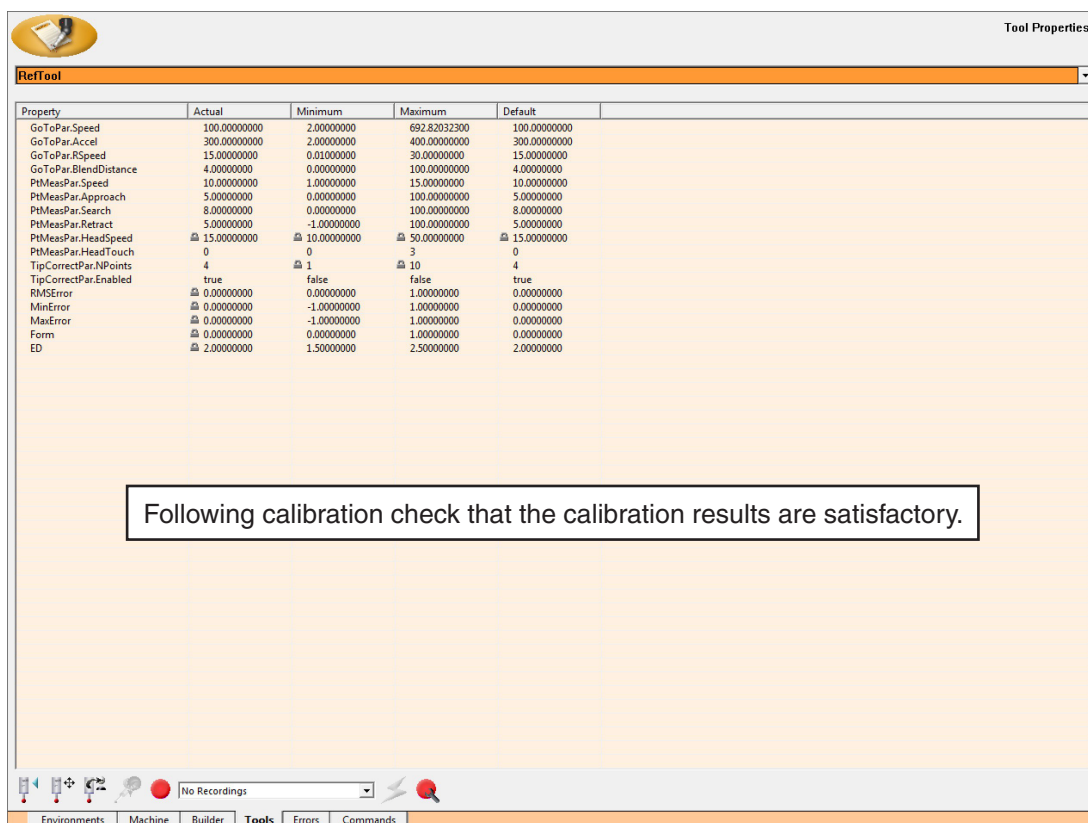During the calibration of RefTool the position of the sphere is also measured and stored within the UCCserver system. This enables the automatic calibration of all other tools created.

Tool Properties

RefTool

Property	Actual	Minimum	Maximum	Default
GoToPar.Speed	100.00000000	2.00000000	692.82032300	100.00000000
GoToPar.Accel	300.00000000	2.00000000	400.00000000	300.00000000
GoToPar.RSpeed	15.00000000	0.01000000	30.00000000	15.00000000
GoToPar.BlendDistance	4.00000000	0.00000000	100.00000000	4.00000000
PtMeasPar.Speed	10.00000000	1.00000000	15.00000000	10.00000000
PtMeasPar.Approach	5.00000000	0.00000000	100.00000000	5.00000000
PtMeasPar.Search	8.00000000	0.00000000	100.00000000	8.00000000
PtMeasPar.Retract	5.00000000	-1.00000000	100.00000000	5.00000000
PtMeasPar.HeadSpeed	15.00000000	10.00000000	50.00000000	15.00000000
PtMeasPar.HeadTouch	0	0	3	0
TipCorrectPar.NPoints	4	1	10	4
TipCorrectPar.Enabled	true	false	false	true
RMSError	0.00000000	0.00000000	1.00000000	0.00000000
MinError	0.00000000	-1.00000000	1.00000000	0.00000000
MaxError	0.00000000	-1.00000000	1.00000000	0.00000000
Form	0.00000000	0.00000000	1.00000000	0.00000000
ED	2.00000000	1.50000000	2.50000000	2.00000000

Following calibration check that the calibration results are satisfactory.

No Recordings

Environments | Machine | Builder | **Tools** | Errors | Commands

Now that RefTool has been calibrated all other tools should now be calibrated using the following method from the 'Tools' tab. From the drop-down menu select the tool to be calibrated.
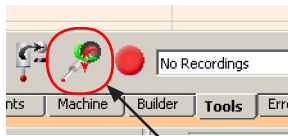
Click: 'Head angle selector' icon.

Select the tools and positions to be calibrated as follows:

(Position A=0°, B=0° will be selected by default)

Hold down the CTRL key then double left mouse click on all of the other tool positions required.

Having selected the required positions right mouse click on any of the positions and select 'Requalify'.

This will then show how many tools have been selected.

NOTE: DO NOT right mouse click in any other box as this will clear the selections and ask to create a new tool.

Five selected tools to be calibrated.
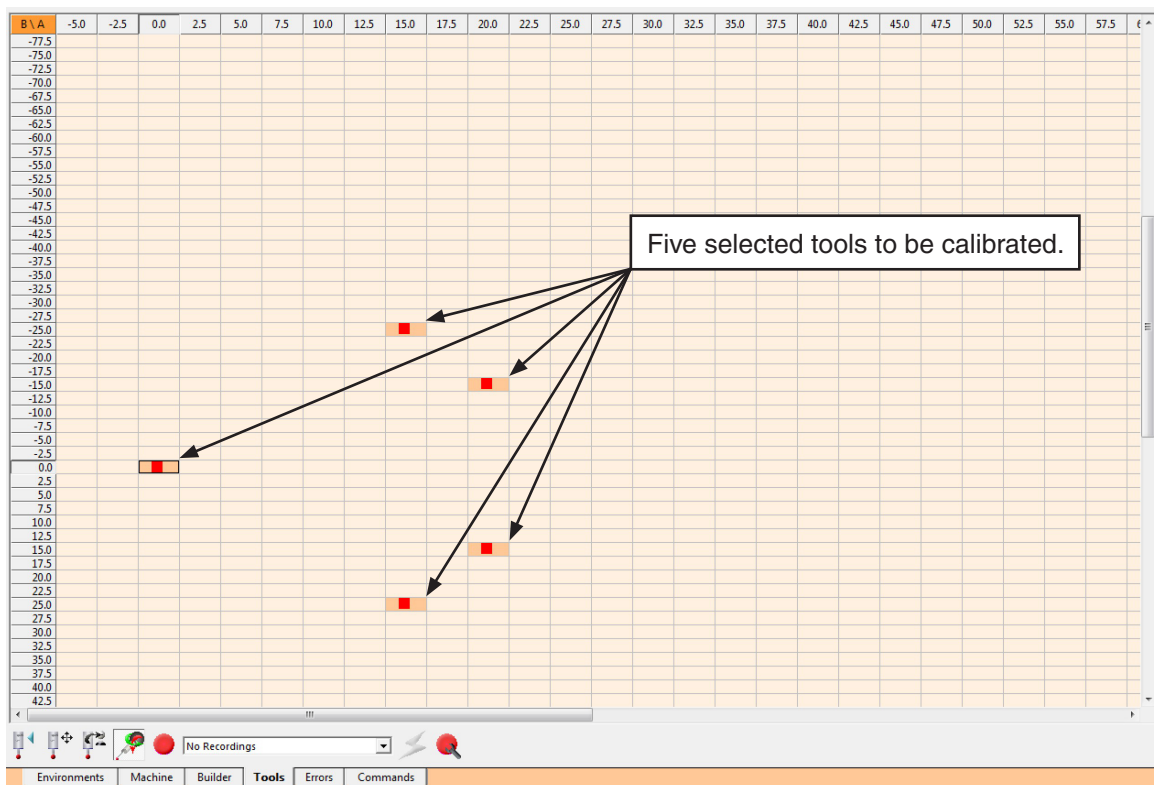
When calibration has been completed check the results are satisfactory.

NOTE: If any component part of the tool is changed / replaced the tool must be re-qualified. The existing calibration must be cleared before requalifying. In this instance, requalifying without clearing the existing calibration data is not acceptable.

7   UCCserver tool definitions

Tools	Components	CalibrationParts	
BaseTool	PH10_TP200		I
NoTool			
RefTool			
UnDefTool			

BaseTool: This tool is a default system tool which is not used by the Renishaw system. It holds the default DME capabilities, eg. speed, acceleration, etc.

NoTool: When selected this tool will allow the machine to move with no tool fitted to the probe system. It cannot be used to measure.

RefTool: This tool records the location of the sphere when calibrated. It cannot be indexed and should not be used for general measurement functions.

UnDefTool: This tool is selected when the system does not know what tool is currently active, typically following a generated error such as a probe crash.

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